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I wish to express my opinion like several others who have spoken or written about Ebola virus disease (EVD) in recent times. I am coming from a different premise. There is a Spanish proverb that says "The beginning of health is to know the disease". Ebola has been known to medical science for almost four decades [1] and precisely since 1976 when the index case appeared in Kitwit, Democratic Republic of Congo (then Zaire). Since then about 20 more epidemics have occurred, some involved Uganda, Sudan and Gabon [2-4]. We know that Ebola is a severe, often lethal and contagious viral haemorrhagic disease that can infect humans and non-human primates such as monkeys, gorillas and chimpanzees and the fruit bat, which is its intermediate host. Ebola virus (EBOV) is spread through bodily fluids like plasma, serum, saliva, sputum, semen and urine. It can also be transmitted through breast milk, vomit, tears mucus and faeces. A broken skin facilitates its transmission.

The EBOV does not survive long outside the human body and transmissibility is much more by direct contact of body fluids from patients in the community. Recent reports published in American Journal of Transplantation show that the EBOV can also be transmitted through organ donation [5]. The researchers warn that it is “very important not to overreact to the very low risk that a potential donor might have the Ebola virus, and as a consequence, unnecessarily discard potentially life-saving organs” [5]. The EVD symptoms include fever, headache, muscle pain, vomiting, cough, diarrhea, stomach ache, kidney and liver diseases, weakness, difficulty in breathing and bleeding into the skin and other

organs and also vesicular rash or rose spots or even inflammation of the throat [6].

Virologists and epidemiologists have told us that Ebola is caused by a zoonotic filovirus that belongs to a new taxonomic group, Filoviridae.

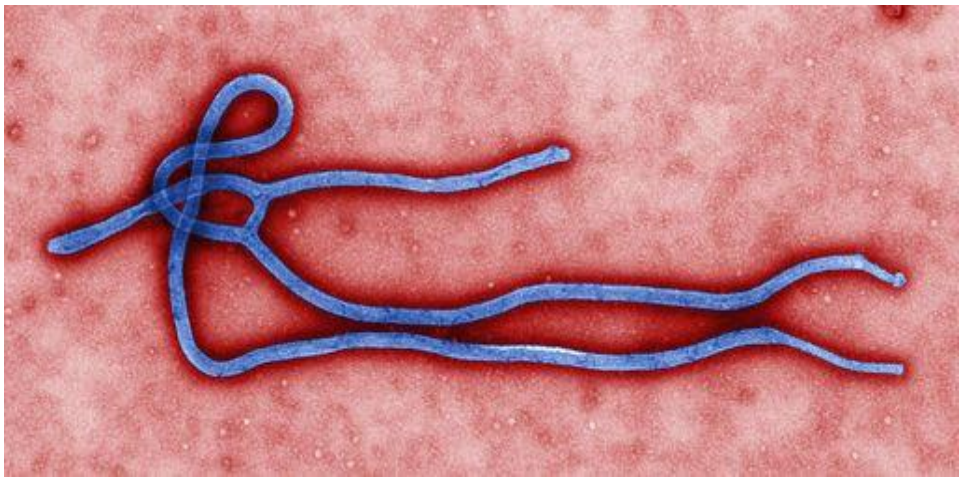

Figure 1: Ebola Virus: Credit: CDC microbiologist Cynthia Goldsmith—-Electron Micrograph [9]

Five species have so far been identified. With the exception of Reston ebolavirus, which has only shown pathogenicity among primates and Tai Forest ebolavirus, which has caused only a single human disease to date; the remaining three species (Zaire ebolavirus, Sudan ebolavirus and Bundibugyo ebolavirus) are well known for human to human transmission [7]. EBOV is a pleomorphic, single stranded RNA virus with average diameter of 80nm, but with a length that varies from 130nm to 14000 nm (Fig. 1) [8]. EBOV is a biosafety IV pathogen that has never before infected so many people so quickly over such a vast geographical region for so long that it has sparked an international health response. The EBOV is smart at suppressing host anti-viral response that allows the virus to spread quickly throughout the body. EBOV is not airborne. It can mutate during replication-when errors in its RNA may weaken its ability to cause an infection [5]. The United States Centers for Disease Control and prevention (CDC) maintains that this is not only the largest recorded Ebola outbreak in history but also the first Ebola epidemic that the entire world has ever known. The latest statistics put the number of fatality in the current outbreak in West Africa at about 8,000 with over 20,000 that may have been infected [5]. Most of these figures are from the three epicenter countries of Guinea, Liberia and Sierra Leone. Recent reports indicate that the epidemic in Liberia is beginning to slow down with fewer new cases being reported. Unfortunately the story is different with Sierra

Leone where there is a new outbreak recording some 1692 new confirmed cases as at 3rd December, 2014 [5].

With the above mentioned information it is very clear that we are not ignorant about Ebola - what causes it and how it is transmitted. Why then this excessive excitability and panic called hysteria in the United States? Why is the fear of contacting Ebola more contagious than the disease itself? The CDC Director-Dr. Tom Frieden- has repeatedly given many press conferences on Ebola, explained times without number the CDC strategy to contain the disease, as the nation's public health watchdog [9]. The CDC has designated five airports in the country and set up testing centres to screen passengers arriving in the USA for Ebola antibody. Any passenger that has fever, provided that it is not from Influenza, Malaria or Marburg disease (caused by another lethal virus in the same family as Ebola) would be tested for Ebola and if positive would be quarantined. But you don't quarantine somebody who does not have symptoms of Ebola. The case of the Maine (USA) nurse is a lesson for all. Kaci Hickox, after risking her life to attend to Ebola patients in Sierra Leone was forced to self-quarantine herself even though she did not present with any symptoms of Ebola! She hired an attorney to free her from infringement of her civil liberty and fundamental human right. The National Institute for Allergy and Infectious Diseases (NIAID) Director-Dr Anthony Fauci- corroborated and supported the actions of his colleague, Director of CDC, all in their efforts to educate and reassure the American public of their determination to prevent the spread of Ebola in the USA [10]. Dr. Frieden appeared at the US Congress to answer questions. The United States President-Barack Obama- also summoned him on Ebola control, addressed American people many times to allay their fears about Ebola. The President even appointed an Ebola Czar to coordinate surveillance of the Ebola disease in United States. He deployed some 4000 military personnel for a mission he called Operation United Assistance to contain the Ebola outbreak at its source through logistics and other support, an operation that has cost US government $360 million so far in fighting Ebola in West Africa. The President is seeking from the US Congress additional $6.2 billion to confront Ebola at its source in West Africa and secure US against any possible spread [5]. The Vice President-Joe Biden- in a TV interview with CNN did the same. The Mayor of Dallas towed the same route in enlightening the public.

Furthermore, the United Nations Secretary-General, Ban Ki moon, has also thrown his weight in his November 3, 2014 press conference in Vienna. He warns against quarantining Ebola health workers that do now show symptoms of EVD. He added that: "The best way to stop this virus is to stop the virus at its source rather than limiting and restricting the movement of people or trade." He also noted that some US state officials have imposed quarantine on health professionals returning from Ebola-ravaged countries, but the US government opposes such measures [5].

The two nurses from Dallas Presbyterian Hospital that attended to the index and fatal case in the US - Eric Thomas Duncan from Liberia- have been treated and declared Ebola-free. In addition, two good Samaritans from the Samaritan Purse (a Christian relief and evangelism organisation) that were infected in Liberia- Dr. Kent Brantly and Nancy Writebol- have been treated with the monoclonal antibody Zmapp. They have not only recovered but even donated plasma to save other patients. A Spanish nursing assistant who recovered from Ebola was recently released from a hospital in Madrid. A Ugandan doctor has also been released from university hospital in Frankfurt after recovery. He was treated with an experimental drug called FX06 developed by scientists at Vienna General Hospital. The drug was initially designed to treat vascular problems and heart attack. This means that Ebola can be treated and can be cured. The term "cured' is used because there is no evidence that the virus will reactivate and cause disease again, even though "we have no specific therapy that targets the virus". This is according to recent research by Christopher Blaser - a Professor of virology at Mount Sinai hospital in New York and Prof. David Moore, a Professor of Infectious Diseases at the London School of Hygiene Tropical Medicine [5].

Some misinformed persons or skeptics in our society are suggesting that the US government places a travel ban for people of West Africa even when experts have advised to the contrary since this measure cannot slow down the epidemic. The experts have also advised that the best way to contain the epidemic is to stop it at the epicenter of the disease that is Liberia, Guinea and Sierra Leone. Unfortunately Canada and Australia have barred entry for citizens from the three epicenter-countries and some US politicians, dancing to the tune of what may bring a political row, have also called for a similar ban by the United States. This did not happen.

It is being rumored that some agencies no longer want nurses from Africa (mind you no more epicenter-countries) but the whole of Africa. A friend called me to tell me that a teacher from Loiusiana is being quarantined because she returned from Tanzania. Some health workers who recently returned from Nigeria were requested not to come to work until after the period of incubation of the virus which is 21 days! Mind you Nigeria was declared Ebola-free by World Health Organisation (WHO) on October, 20, 2014. This is panic measure and NOT public health measure. Public health, as defined by the American Public Health Association, promotes and protects the health of people and communities where they live, learn, work and play. Public health prevents people from getting sick or injured in the first place. It also promotes wellness by encouraging healthy behaviour [11].

A colleague of mine recently sent me an e-mail expressing how disappointed he was to learn that "the greatest and richest country in the world today cannot manage a few cases of Ebola without panic". He went further to say that this "just exposed the very limited knowledge and extremely poor status of the US medical

education on infectious disease". This could be the case if some misguided persons in the society continue to send negative and damaging signals about the efforts the US government has made and are making to contain the scourge of Ebola. The effort is centred on increasing awareness and eliminating stigmatisation.

The WHO, as part of its commitment to safety and protection of healthcare workers and patients from transmission of Ebola virus disease through contaminated droplets and fluids, has updated personal protective equipment (PPE) guidelines for health workers. More, the WHO in October constituted a high-level meeting, chaired by its Director General - Dr. Margaret Chan- on Ebola vaccine access and financing attended by many developed and developing countries of the world, pharmaceutical companies and World Bank to address the question of Ebola vaccine. In attendance in this meeting was GAVI-a public-private partnership that funds vaccine production in low- income countries.

The good news is that the first batch of experimental vaccine VSV-EBOV is now in Geneva Switzerland as recent as October 2014. The vaccine developed by Public Health Agency of Canada used the Zaire strain, which is the deadly form of the virus causing the epidemic in West Africa. The trial of this candidate vaccine which has commenced at the University Hospitals of Geneva will also be conducted in African countries (Gabon and Kenya) as early as January, 2015, if judged safe and efficacious [5].

The United States Army Medical Research Institute of Infectious Diseases has helped to conduct much of the basic research for the two experimental vaccines available, now undergoing safety testing and clinical trials at the US National Institute of Health (NIH) [6]. At the Jenner Institute of Oxford University, scientists, led by Prof. Adrian Hill, have begun testing the safety of a candidate booster vaccine, developed by Bavarian Nordic, a company based in Denmark, to find out whether it could increase immune response seen in volunteers previously vaccinated with the GSK/NIH candidate vaccine that is undergoing trial in the United States and Switzerland. The Bavarian Nordic vaccine uses the same virus gene as in GSK/NIH vaccine but in a modified vaccinia Ankara (MVA) virus. Researchers envisage that this prime-boost approach, employed previously in malaria, hepatitis C, HIV, Influenza and Tuberculosis, will generate anamnestic response which may increase immune responses substantially and offer longer-lasting protection against Ebola. With these clinical trials for Ebola vaccine now under way, and with governments and international organisations as well as manufacturers funding them, one would expect that the panic would soon be over as the problem is being addressed. However, the challenge remains in funding to scale up to commercial production and stock-piling of vaccine to ensure adequate preparation is made should another outbreak occur [5].

Encouraged by the success story of a study by Mapapa and colleagues in 1995 in Kitwit,

Democratic Republic of Congo (DRC) where seven out of eight Ebola patients were successfully treated with convalescent plasma [12], WHO has reviewed and endorsed convalescent blood and plasma as having the potential in improving clinical care and reducing the unacceptably high number of deaths. Based on this observation, interest in convalescent therapy is growing and will continue even after an Ebola vaccine is produced. The first clinical trials are starting in West Africa to test whether transfusing patients with plasma or blood donated by Ebola survivors is safe and effective in reducing illness and death [6].

As I suggested in the 1990s regarding the problem of AIDS, the only vaccine now available for Ebola is Public Enlightenment. Experts worry and warn against taking advantage of drought in Ebola drugs to give patients anything that may worsen their condition. This happened in the early years of AIDS pandemic when 'everybody and their brothers became HIV/AIDS specialists. At the end of the "game" some proved to be charlatans. It is to prevent this type of scenario that the WHO team leader on experimental Ebola drugs, Martin Friede advised that "There are situations where doing nothing is actually better than doing something that is not justified" [5]. Another way of putting it is if you cannot help the patient, do not hurt them.

The scientific quest for a ready answer to a devastating epidemic, such as Ebola, could actually waste time and resources and potentially endanger lives. For example, Italian doctors are testing the anti-arrhythmia drug - Amiodarone at a treatment centre in Sierra Leone. Although the drug has some action against the EBOV in-vitro, the fear is that the concentration required for it to be effective might be unsafe in patients. The WHO Scientific and Technical Advisory Committee on Ebola Experimental Interventions would soon publish a registry, listing drugs, testing methods and results. It is hoped that this will dissuade researchers from bad science - duplicating previous efforts and trialing drugs potentially harmful to patients that they are trying to treat.

At the forefront of the global response is a medical charity called Medicins Sans Frontieres (MSF). These doctors without borders have been playing a pivotal role since the beginning of the epidemic over nine months ago - building health centres, training care staff, treating patients and even advising the United Nations on security issues. MSF treatment centres in the three countries ravaged by Ebola (Guinea, Liberia and Sierra Leone) will host clinical trials of three potential Ebola drugs planned to begin very soon. While this study is yet to begin Karpas [13] suggests that since there are no readily available and effective drugs against this lethal virus it would be reasonable to explore the use of Passive Immunotherapy (PIT) based on the reported study of Mupapa et al. during the 1995 Ebola outbreak in the DRC mentioned earlier [12]. Based on his experience with PIT in HIV/AIDS patients, Karpas suggests that plasma

from people who recovered from the Ebola infection could be used to treat not only the advanced patients but also virus-infected pre-symptomatic individuals during the incubation period [14]. Hyper immune plasma can lead to the recovery of terminal patients. If given earlier, it might prevent development of Ebola disease by reducing the viral load and helping the immune system to cope with the infection [14].

The advantage PIT has over human monoclonal blocking antibodies to Ebola virus, such as Zmapp, is that it can be offered without delay. Early studies with equine immunoglobulin have already shown activity in suppressing Ebola virus viremia and delaying disease onset and death in non-human primates [15].

EVD should not be considered as another tool for discrimination and stigma. The Bible tells us that "so whoever knows the right thing to do and fails to do it, for him it is sin" (James 4:17). An English parliamentarian and philosopher, Edmund Burke put it in a different way: "All that is necessary for triumph of evil is that good men do nothing" [16]. Next to appreciating the international and private sector outpouring of support in terms of cash and commitment, the second best thing is to appeal to the international community to hearken unto the words of a literary critic and satirist, Henry Louis Mencken "For every complex problem there is an answer that is clear, simple and wrong" [17]. Discrimination on the guise of Ebola is wrong and unacceptable. It was Martin Luther King Jr- the renowned afro-american civil rights leader- who said that “The ultimate measure of a person is not where one stands in moments of comfort and convenience, but where one stands in times of challenge and controversy" [18]. Let us stand together to defeat Ebola. Let us plan and not panic any more about Ebola virus disease.

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